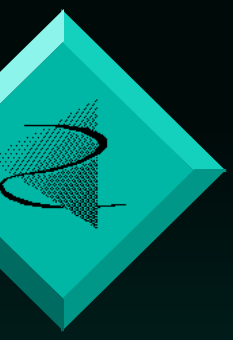
Flight System Testbed

Purpose

- Develop a rapid prototyping facility for future missions, which provides a “quick start” for developing capabilities, evaluating mission architectures, and implementing mission designs through the use of inherited and reusable capabilities.

Scope

- The Flight System Testbed is intended to support all future missions and all mission phases. The FST is developing simulations and integrating prototypical implementations of elements of the end to end information system (EEIS).



Purpose of the Demo

Advise management and potential customers of prototyping activities to date.

Solicit inputs for guiding future work.

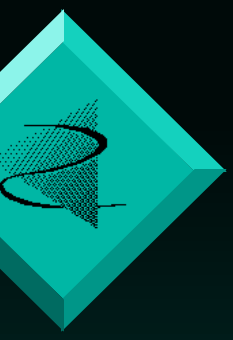
Scope of Demo

End-to-end information system environment

FST Simulation Environment

Composed of separate subsystem implementations

- Provides “plug and play” environment for evaluation of alternate solutions
- Built from COTS products and “reusable” software



Customers

Current

- New Millennium DS-1
- New Millennium DS-2
- STARDUST
- Pluto Express
- TES
- MLS
- MVACS
- Champollion
- Seawinds
- MODP
  (MOCA)
- MGSO
  PCLPDT
- AOT
  Autonomy Integration
- TRW
  Autonomous S/C Demo

Customers (cont)

Current (cont)

- Galileo
- Mars Pathfinder
- Micro Gyro (CHμG)
- APEX/AFC

Planned

- Discovery 96
- SIM
- SMEX
- Mars 98 (Lockheed/MMA)
- Phillips Lab

Technology Integration & Demonstration

Identify New Technology for small spacecraft

- Work with JPL technical divisions and industry

Integrate with FST End-to-End system

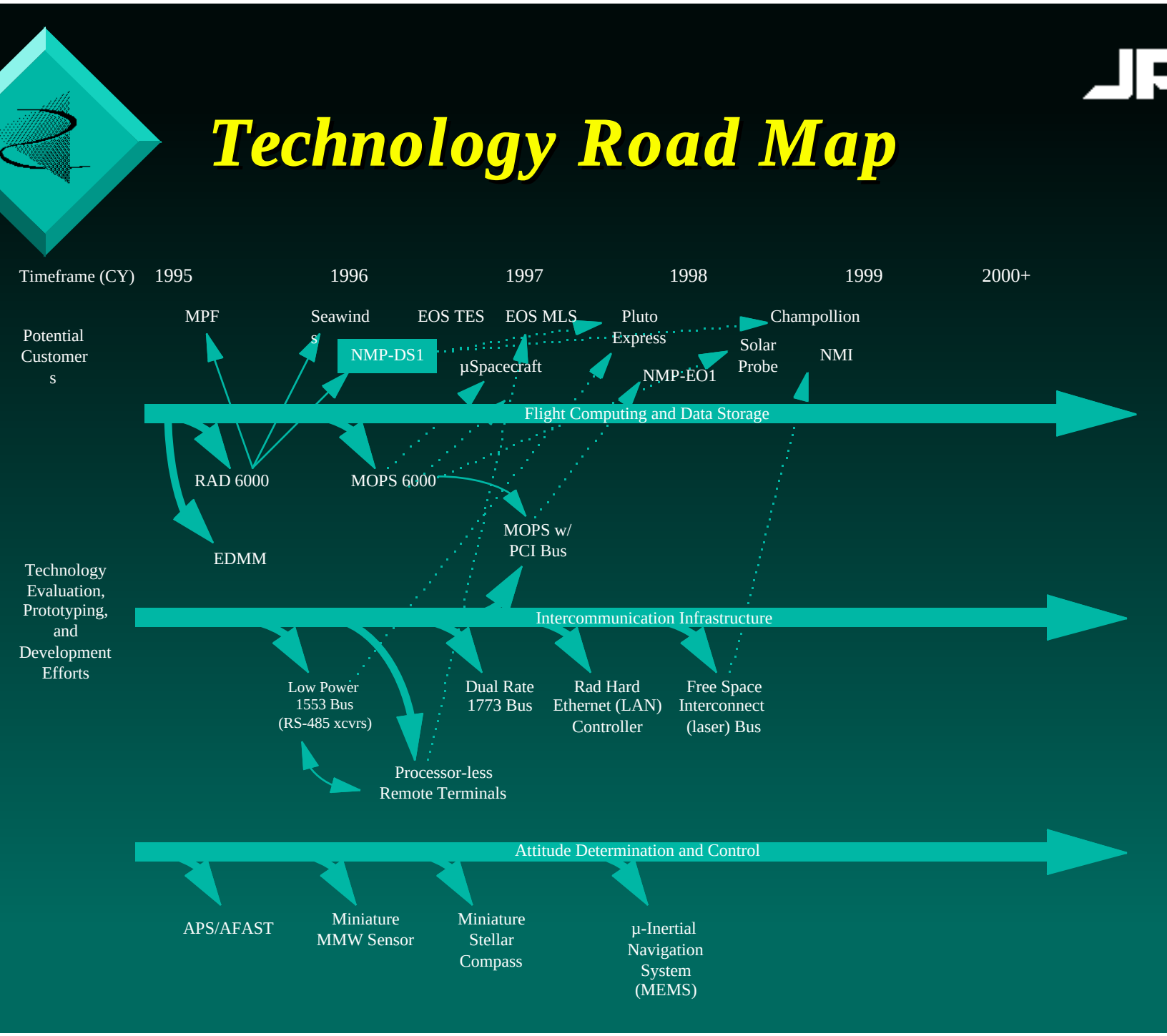
Evaluate system level impacts of new technology

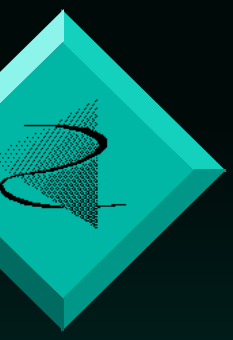
- Mitigate risk associated with untested technology

Showcase new technology for selection by projects

- Create “Technology Fair” environment

Technology Road Map





Prototype Team

Lead -- Chuck Ames (31)

Avionics -- Matt Wette (34), Johnathan Cameron (34 Scott Burleigh (31)

Power -- Mario Matal (34)

Instrument -- Ray Swartz (38)

Telecom -- Kar-Ming Cheung (33)

DARTS -- Abhi Jain (34), Frank Loya (34)

GSE -- Nancy Chiang (35)

Integration -- Minh Lang (31), Steve Allen (31), Bob Ebbett (31)

Documentation -- Jennifer Peden (31)

Prototype Objectives

Support investigation of New Technology

- by providing a baseline end-to-end system as context for integration and evaluation of system-level impacts

Facilitate evaluation of Design Alternatives

- by providing a rapid prototyping environment supported by model-based simulation

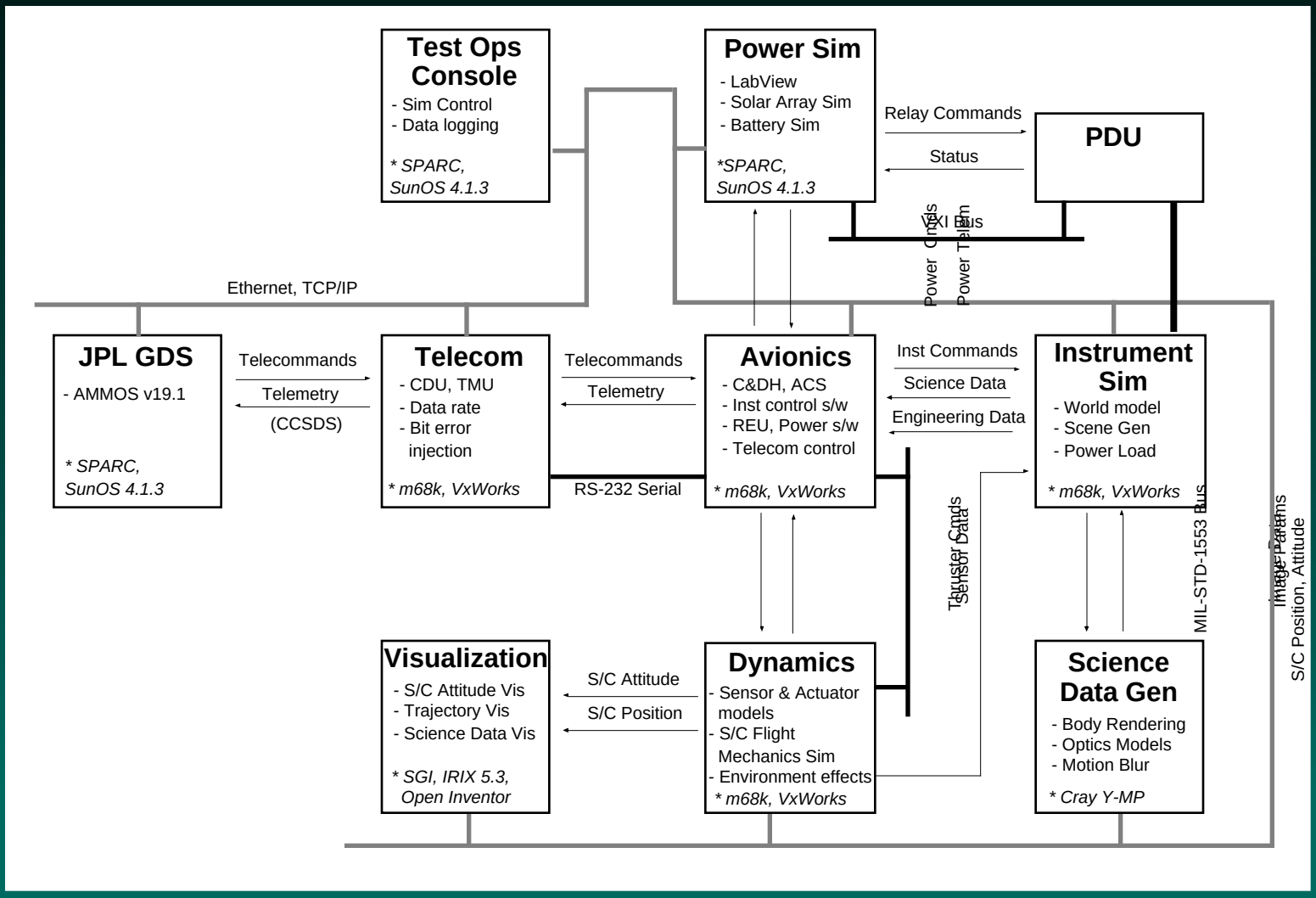
Provide projects a Quick-Start

- by supplying a stockpile of re-useable components in a ready-to-use development environment

Support Concurrent Engineering of flight and ground systems

- by providing simulated subsystems which are plug-compatible with breadboards, engineering models, and flight components.

FST Prototype Architecture



Demonstration Scenario

Spacecraft is on trajectory past comet WILD-2, just after closest approach

Demonstration

- **Downlink telemetry**
- **Turn to orient camera toward comet nucleus**
- **Acquire sequence of images**
- **[Turn to orient antenna toward earth]**
- **[Downlink comet images]**